MAU 34804 Lecture 29

John Stalker

Trinity College Dublin

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Plan

- Today's revision session:
  - What did we cover? Why?
  - How is the exam structured? Why is it structured that way? How should you revise for it?
- Tuesday's question session:
  - The will be one more 'lecture', on Tuesday 21 April, where I answer a selection of questions that you email me between now and then.
  - If you don't email them I won't answer them.
- I'm not planning on posting anything after that, but if I need to then I will email you all.

Module Content

- Preliminaries
  - Real analysis/Metric spaces (review)
  - Convexity (partly review)
  - Correspondences/Hemicontinuity (new)
- Main mathematical content
  - Berge maximum theorem
  - Basic algebraic topology (simplicial complexes)
  - Sperner's lemma
  - Brouwer and Kakutani fixed point theorems
  - Perron-Frobenius theory
- Main economic content
  - Input-output analysis (Leontief)
  - Two person zero sum games (von Neumann minimax theorem)
  - More person non-zero sum games (Nash equilibria)
  - Pure exchange economies (Walrasian equilibrium)

Everything is examinable, but some things are more examinable than others.

Take home open book exams

How does a take home exam open book exam differ from a conventional exam?

- There is no point in asking for definitions, statements of theorems or proofs which appeared in lecture or the notes.
- The exam has to cover all, or nearly all, the content.
- Going down a blind alley is no longer a disaster.
- There is time for a bit more detail in answers, so less telepathy required when marking.
- It's possible to do more complicated examples.
- Examples and theorems should be somewhat non-standard.
- Ideally there should be more than one way to do each problem.

Had I known we would have a take home open book exam from the start I would have taught the module differently, but there's no way to go back in time.

This exam

- There are six questions, with four parts each, all mandatory.
- Most, but not all, topics in the module are covered. The overlap in topics with the practice exam is essentially random.
- Not all questions/parts are equally hard or time consuming.
- Everything is an unseen 'theorem' or example.
- The 'theorems' vary from simple consequences of the definitions to more substantial results, split across several parts, which could have been taught as propositions or theorems in the module, but weren't.
- The examples are mostly fairly complicated, but more time consuming than hard. A small number are counterexamples.
- A rough split is 1/8 easyish theorems, 2/8 easyish examples, 2/8 harder theorems, 3/8 harder examples.

Revision

All you have are David Wilkins' notes, my lectures, your notes or my slides from those lectures, and the practice exam.

- You need to know David's notes well enough to find relevant theorems. Exact statements and detailed proofs are less important than useful tricks and main ideas.
- Similar remarks apply to my lectures. Those mostly follow the notes, but diverge in a few places.
- The practice exam is meant to convey the general flavour of a take home open book exam, rather than the specific topics covered. Your goal should not be to be able to do the problems on the practice exam but rather to understand each topic well enough that you could do similarly difficult problems on that topic. I'm not going to post solutions, because I fear they would do more harm than good. I can answer questions though about whether your solution is valid, provided you ask before the actual exam.